

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Cathey discloses a method of utilizing and etching  $\text{SiO}_2$  in the processing of semiconductor wafers. The method includes utilizing an acid solution comprising at least two different mineral (inorganic) acids in a selected ratio to one another, one of the mineral acids being HF. The preferred ratio of the second mineral acid to HF is between 20:1 and 110:1. Cathey further discloses that the solution comprising at least one mineral acid and HF selectively etches a doped  $\text{SiO}_2$  layer. Cathey further discloses that acetic acid may be included in the solution. However, Cathey states, “[a]cetic acid is a known prior art component in wet acid etching which provides bath stabilization and extends bath life. Such does not constitute a part of this invention, nor is it necessary in the invention.” Cathey, col. 2, lines 49-53. Cathey does not disclose any other organic acid as a component of the solution.

By way of contrast, claim 1 of the presently claimed invention recites, an “etchant solution which selectively etches borophosphosilicate glass over tetraethyl orthosilicate, said etchant solution comprising an organic acid and a fluoride-containing solution, wherein the organic acid is in a volumetric ratio with the fluoride-containing solution at about 10:1 to about 500:1.” Applicants respectfully assert that Cathey does not teach a solution wherein an organic acid is in a volumetric ratio with a fluoride-containing solution at about 10:1 to about 500:1. Instead, Cathey teaches that acetic acid (an organic acid) is not a necessary component of the invention. Col. 2, lines 49-53. Examiner states that Cathey discloses a ratio of the “other acid” to HF between 20:1 to 110:1. Office Action page 2. However, the “other acid” in Cathey is, necessarily, a mineral (inorganic) acid. Col. 2, lines 29-31. Cathey does not teach any ratio of an organic acid to a fluoride containing solution. While Cathey does disclose a solution comprising “30 ml HF, and 60ml acetic acid”, this ratio is not within the presently claimed invention. Col. 2, line 40. As Cathey does not teach or disclose each and every element of claim 1 of the presently claimed invention, Cathey does not anticipate the presently claimed invention. As such, claim 1 is allowable.

Claims 2-4 and 6 are each allowable as depending, either directly or indirectly, from claim 1.

Claim 2 is further allowable as Cathey does not disclose an etchant wherein the organic acid is selected from the group consisting of formic acid, and oxalic acid.

Claim 3 is further allowable because Cathey does not teach a fluoride-containing solution consisting of ammonium fluoride.

Claim 6 is further allowable as Cathey does not teach an etchant comprising acetic acid in a volumetric ratio with hydrofluoric acid at about 10:1 to about 100:1.

### 35 U.S.C. § 103(a) Obviousness Rejections

#### Obviousness Rejection Based on U.S. Patent No. 5,300,463 to Cathey et al.

Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cathey et al. (U.S. Patent No. 5,300,463) as applied to claims 1 through 6 above. Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Applicants respectfully assert that claims 7 and 8 are each allowable as depending from claim 1.

Cathey discloses a method of utilizing and etching SiO<sub>2</sub> in the processing of semiconductor wafers. The method includes utilizing an acid solution comprising at least two different mineral (inorganic) acids in a selected ratio to one another, one of the mineral acids being HF. The preferred ratio of the mineral acid to HF is between 20:1 and 110:1. Cathey further discloses that the solution comprising at least a mineral acid and HF selectively etches a doped SiO<sub>2</sub> layer. Cathey further

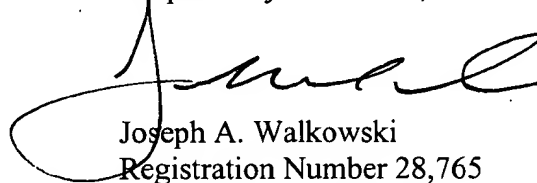
discloses that acetic acid may be included in the solution. However, Cathey states, "[a]cetic acid is a known prior art component in wet acid etching which provides bath stabilization and extends bath life. Such does not constitute a part of this invention, nor is it necessary in the invention." Cathey, col. 2, lines 49-53.

Applicants respect that claim 7 is further allowable because Cathey does not teach or suggest an etchant solution comprising glacial acetic acid and 40% ammonium fluoride by weight in water. Examiner states, "Cathey does not disclose a solution comprising 40% HF in water. However, Cathey discloses that the etch solution comprises 49% HF in water." Office Action, page 3. Applicants respectfully assert that claim 7 recites an etchant comprising "40% ammonium fluoride"; not HF. Cathey does not teach, suggest or otherwise motivate one to use an etchant solution comprising acetic acid and ammonium fluoride. In fact, the Cathey reference teaches away from using acetic acid. Cathey, col. 2, lines 49-53. Finally, Cathey does not teach, suggest or otherwise motivate one to use ammonium fluoride rather than HF in the solution. Cathey, cols. 1-2, lines 63-6. As such, claim 7 is not obvious in view of Cathey.

### CONCLUSION

Claims 1-4, and 6-15 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully Submitted,



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